

Post-trial Motions Hearing

SAMSUNG'S MOTION FOR JMOL ON DAMAGES (DKT. 577)

KAIST IP US OPPOSITION (DKT. 593)

SAMSUNG'S REPLY (DKT. 604)

KAIST IP US SURREPLY (DKT. 619)

Federal Circuit Affirmed Awarding 91% of Savings

“A party challenging a jury's verdict on damages 'must show that the award is, in view of all the evidence, *either so outrageously high or so outrageously low as to be unsupportable* as an estimation of a reasonable royalty.”

-- *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1238 (Fed. Cir. 2011)
(citation omitted)

Substantial Evidence Supports \$400M Award

- Nov. 2016 to May 2018 damages: “conservative” and a “minimum” of \$321,438,451 for Samsung alone.
Dkt. 491 (6/12/18 PM) at 202:3-14 (Weinstein)
- Nov. 2016 to May 2018 incremental benefit to Samsung from increase speed/battery and cost savings: \$2.75 billion.
Dkt. 491 (6/12/18 PM) at 206:11-20, 209:10-16, 197:5-21 (Weinstein)
 - \$845 million from cost savings
 - Speed/battery and cost savings solely attributable to the transistor of the '055 Patent.
Dkt. 491 (6/12/18 PM) at 22:2-29:15 (Kuhn)

Federal Circuit Affirmed Awarding 91% of Savings

- Cost savings from infringement: “\$8500 per unit”
- “Concession by Mr. Powell’s expert that a reasonable royalty would be some amount less than \$7,000 per unit”
- “[J]ury’s award of \$7,736 per unit” = 91% of cost savings
- KAIST received 47% of cost savings or 15% of incremental apportioned profits/cost

-- ***Powell v. Home Depot U.S.A., Inc.***, 663 F.3d 1221, 1238 (Fed. Cir. 2011)

Monsanto Requires Affirmance

- Monsanto charged \$6.50 technology fee (plus seed seller fees)
- Patent owner received 65% of cost savings.

“The savings of \$31 to \$61 per acre was equivalent to a ***savings of \$31 to \$61 per bag of seed***. Based on those advantages alone, it was reasonable for the jury to suppose that, in a hypothetical negotiation, a ***purchaser would pay a royalty of \$40 per bag*** for the Roundup Ready seed.”

-- ***Monsanto Co. v. McFarling***, 488 F.3d 973, 977 (Fed. Cir. 2007)

“Minimum” of \$321M = Past Damages Only

10 Q. So one final summary, Mr. Weinstein. Can you please
11 tell the jury what the minimum damages are to compensate
12 KAIST for infringement by Samsung of the patent-in-suit?

13 A. I've concluded that the minimum damages to compensate
14 KAIST for infringement by Samsung of the patent-in-suit for
15 the period of November 29th, 2016, to May 14th, 2018, are
16 \$321,438,451.00.

Dkt. 491 (6/12/18 PM), at 209:10-16 (Weinstein)

Samsung's Total Incremental Benefit from Infringing (Incremental Profits + Cost Savings) = \$2.7B

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- (1) Solely attributed to Samsung infringement
- (2) Just for past period of 11/2016 to 5/2018

15 And so when you summarize all of that, the
16 benefits -- this is not the damages, these are the
17 benefits -- associated with this technology that would be
18 known to the parties at the time of the hypothetical
19 negotiation are approximately \$2.7 billion in benefit to
20 Samsung; \$2.47 billion to Qualcomm; and \$821 million to
21 GlobalFoundries.

Dkt. 491 (6/12/18 PM), at 197:15-21 (Weinstein)

Samsung Incremental Benefit = \$2.7B

Samsung speed/battery profits \$1.87B

Samsung cost savings \$845M

TOTAL Samsung incremental
benefit from *just* 11/2016 – 5/2018 \$2.7B

Substantial Evidence for Per Unit Rate

Samsung speed/battery profits	\$4.74 / handset
Samsung cost savings	12% of 25% of direct manufacturing costs
Past Damages Period (11/2016 – 5/2018)	19 months
Patent Term lasts until 2/2023	57 months

Dkt. 491 (6/12/18 PM) at 68:17-24, 206:4-8, 206:25-207:4 (Weinstein)

Regression Analysis Was Highly Conservative

Damages model did not include profits attributed to increased GPU performance

7 Qualcomm Snapdragon, this is 28 to 14, the last good node we
8 could compare to. Their own benchmarks was 23 percent for
9 what the max megahertz benefit was. 22 and a half percent
10 on battery life -- again, their benchmark. And then that 2X
11 factor, 44 and a half battery life converted to performance.
12 These are very conservative numbers. The user benefit will
13 actually be much greater. We haven't actually looked at all
14 of what the GPU benefit would be, and that drives all the
15 graphics.

Regression Analysis Was Highly Conservative

	Actual incremental improvement as measured (Witt)	Conservative figure used for damages calculation (Weinstein)
Speed	18-25%	20%
Battery	12.375%	12%

Dkt. 491 (6/12/18 PM) at 189:5-19 (Weinstein), 139:21-140:15 (Witt)

Cost Savings Analysis Was Highly Conservative

- Kuhn and Witt: 25% cost savings was based on comparison to 28 nm
 - Kuhn: “[T]he 20-nanometer node was actually more expensive.”
- GloFo technical witness Srikanth Samavedam “confirms that the density benefit of 28 [nm] to 14 [nm] is determined by the FinFET”

Dkt. 491 (6/12/18 PM), at 28:5-29:3 (Kuhn), 136:4-11 (Witt)

Cost Savings Analysis Was Specific To Samsung Design

2 QUESTION: Who are Qualcomm's foundry suppliers for
3 products made with the 14-nanometer process?

4 ANSWER: 14-nanometer process, we have Samsung
5 Foundry and GlobalFoundries.

6 QUESTION: Can we please mark this as Exhibit 2?

7 And what this table shows is that by moving from
8 20 nanometers at TSMC to 14LPP at Samsung, Qualcomm saves
9 over \$600 million, is that right?

10 ANSWER: It's a projection. For example, the
11 Iстари Lite, that one, that product, I don't think that
12 one's ever in production. So I think these are the
13 projected number.

14 QUESTION: Okay. So the projected savings was over
15 \$600 million; is that accurate?

16 ANSWER: This is what this slide shows.

17 QUESTION: And this is -- it's a projected savings
18 of over 600 million, right?

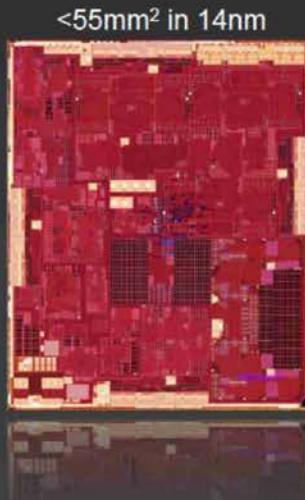
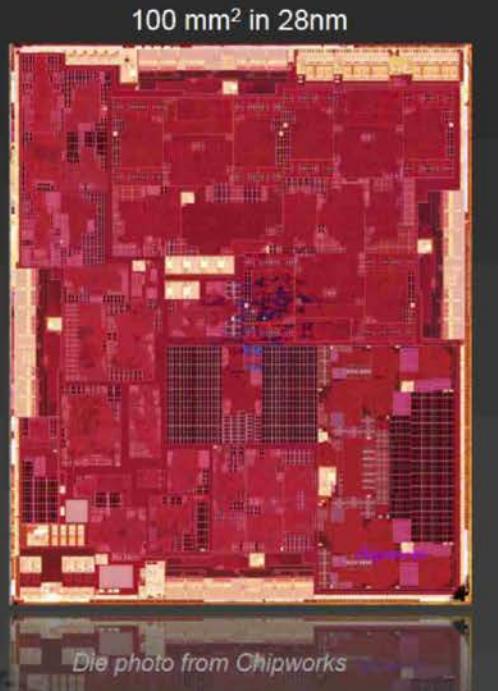
19 ANSWER: This -- this slide shows.

20 QUESTION: What does "Iстари" refer to?

21 ANSWER: Iстари is one of our premium-tier product.
22 The product we run at Samsung.

Cost Savings Analysis Was Specific To Samsung Design

14nm FinFET Target Application: Premium Mobile



- **Key driving forces:**

- Scaling to achieve lower die cost
- Scaling to increase features
- ~2x output increase per wafer
- More than 60% in power reduction

	28nm	14nm
Power (a.u.)*	1	0.4
Performance (GHz)	1.2	>2.2
Area (mm ²)	100	<55
Est. Die Cost (a.u.)	1	0.75

* Power estimated at target performance

Cost Savings Analysis Was Specific To Samsung Design

11 Here we see a return to traditional Moore's Law scaling with
12 a cost benefit with a node jump. And so we have here from
13 GlobalFoundries an estimated die cost improvement of 25
14 percent. This is from PX-0849. And above it is an area
15 comparison. And I used some of my own knowledge from Intel,
16 plus the area comparison number, to check that die cost
17 number, and I got a rather similar number. I got 23
18 percent. So I agreed with their 25 percent in cost savings
19 number.

Additional Evidence Of Samsung Benefit Beyond “Minimum” Amount

- Samsung received \$220 million in up-front fees plus \$53 million in royalties from GloFo for GloFo's use of Samsung 14 nm tech
- Samsung continues to receive \$7 million per quarter in running royalties from GloFo through 2020
- Samsung recaptured business from Apple and Qualcomm, and gained new business from Nvidia.

Dkt. 495 (6/13/18 PM Sealed) at 6:15-7:3 (David Bennett)

Dkt. 494 (6/13/18 PM) at 10:19-11:20 (Dongwon Kim cross)

Substantial Evidence Supports \$400M Award

- Patent in effect and would not expire until February 2023.
Dkt. 497 (6/14/18 PM) at 68:17-24.
- “Minimum” damages: \$4.74 per unit for increased speed and battery life and a 12% share of Samsung’s cost savings, benefits all owing to the ’055 Patent.
Dkt. 491 (6/12/18 PM) at 206:4-89, 206:25-207:4.
- Qualcomm projected robust demand after May 2018.
PX0070.10

Robust Demand Projected After May 2018

#4 Wafer Pricing & Defect Density

- Favorable wafer pricing with commercially bound defect density commitments (both random and systematic DD)

Wafer Price	4Q'15	1Q'16	2Q'16	3Q'16	4Q'16	1Q'17	2Q'17	3Q'17	4Q'17	4Q'18
MSM & Product converted from 20nm to 14LPP	\$7,857	\$7,745	\$7,636	\$7,527	\$7,421	\$7,256	\$7,164	\$7,062	\$6,962	\$6,863

SEC committed Istari DD	0.35	0.284	0.24	0.2	0.19	0.19	0.19	0.19	0.19	0.19
Istari KGD at SEC	\$26.4	\$23.9	\$22.3	\$20.8	\$20.3	\$20.0	\$19.7	\$19.4	\$19.2	\$18.9
Istari KGD at TSMC	\$30.0	\$27.7	\$26.0	\$25.2	\$24.6	\$24.0	\$23.6	\$23.2	\$22.8	\$22.6
<i>KGD Savings</i>	-\$3.6	-\$3.8	-\$3.7	-\$4.4	-\$4.2	-\$4.0	-\$3.9	-\$3.7	-\$3.7	-\$3.7
<i>Total Spend Savings (M)</i>	\$14.5	\$60.5	\$44.9	\$70.1	\$72.2	\$64.4	\$43.0	\$18.7	\$11.1	\$3.7
Istari										\$403.1

Istari Lite KGD at SEC	\$17.9	\$15.1	\$14.3	\$13.5	\$13.2	\$13.0	\$12.8	\$12.6	\$12.5	\$12.3
Istari Lite KGD at TSMC	\$19.0	\$17.7	\$16.7	\$16.2	\$15.7	\$15.4	\$15.2	\$14.9	\$14.7	\$14.5
<i>KGD Savings</i>	-\$1.1	-\$2.6	-\$2.4	-\$2.6	-\$2.5	-\$2.4	-\$2.3	-\$2.2	-\$2.2	-\$2.2
<i>Total Spend Savings (M)</i>	\$0.0	\$2.6	\$29.3	\$42.3	\$43.2	\$38.4	\$25.6	\$11.2	\$6.6	\$2.2
Istari Lite										\$201.4

\$604.4 M

- ~\$600M cost savings on Istari family

PX0070.10

Substantial Evidence Supports \$400M Award

- Samsung's expert: Samsung would negotiate for a license to cover its customers like Qualcomm and GloFo.
Dkt. 497 (6/14/18 PM) at 64:6-12.
- Samsung claimed it would indemnify Qualcomm:

21 QUESTION: Sir, is it Samsung's position that it
22 has an obligation to indemnify Qualcomm for damages in this
23 case, yes or no?
24 ANSWER: Yes.

Dkt. 493 (6/13/18 AM) at 69:21-24 (Youngjoon Lee).

Samsung Would Negotiate For Foundry and Customer Rights

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6 What kind of rights do they need? *They need*
7 *exactly the same type of rights that Intel got both in terms*
8 *of make, sell, and have made rights, foundry rights, and*
9 *rights for their customers*, because these chips that are
10 accused here go into other products. They go into
11 smartphones made by Samsung, and they go into smartphones
12 and tablets made by other people.

Dr. Becker Defined the Hypothetical Negotiation as Involving All Defendants

Negotiation involves “Samsung, GlobalFoundries, and Qualcomm”:

3 | I imagined a negotiation between Professor Lee and
4 | P&IB and Samsung, GlobalFoundries, and Qualcomm. And in

Lucent Requires Affirmance

<i>Lucent</i>	KAIST IP US
“First, no evidence of record establishes . . . how often the patented method would be used by consumers.”	Nov. 2016 to May 2018: \$2.75 billion Samsung incremental benefit. Dkt. 491 (6/12/18 PM) at 206:11-20, 209:10-16, 197:5-21 (Weinstein)
“Second, the jury heard little factual testimony explaining how a license agreement structured as a running royalty agreement is probative of a lump-sum payment to which the parties would have agreed.”	No comparable license agreements identified.
Third, the license agreements for other groups of patents, invoked by Lucent, were created from events far different from . . . the one patent here . . . ”	No comparable license agreements identified.

***Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1327 (Fed. Cir. 2009)**

The Intel Agreement Was Properly Considered

Laser Dynamics Requires Affirmance

“As a final matter, ***we do not hold that LaserDynamics’ past licenses create an absolute ceiling on the amount of damages to which it may be entitled***, see 35 U.S.C. § 284, or that its history of lump sum licenses precludes LaserDynamics from obtaining damages in the form of a running royalty.”

-- ***LaserDynamics v. Quanta Comput.***, 694 F.3d 51, 81 (Fed. Cir. 2012)

Monsanto Requires Affirmance

Patent Owner charged \$6.50 technology fee per bag:

“[I]t would be improper to hold that Monsanto's reasonable royalty damages are limited to . . . the total amount charged for the seeds and the Technology Fee.”

- Patent owner received 65% of cost savings.

“The savings of \$31 to \$61 per acre was equivalent to a ***savings of \$31 to \$61 per bag of seed***. Based on those advantages alone, it was reasonable for the jury to suppose that, in a hypothetical negotiation, a ***purchaser would pay a royalty of \$40 per bag*** for the Roundup Ready seed.”

-- ***Monsanto Co. v. McFarling***, 488 F.3d 973, 977 (Fed. Cir. 2007)

Mr. Weinstein Directly Engaged Intel Agreement

5 So the next one that I considered is
6 Georgia-Pacific Factor 1, which pertains to rates received
7 by the patentholder for licensing the patent-in-suit. And
8 that's -- that's one of the factors that one looks at.

9 Q. Did you find that there was any actual evidence of
10 prices paid for the patent-in-suit?

11 A. Yes, sir, I did.

12 Q. And what was that?

13 A. There's a license we've heard something about between
14 P&IB on the one hand and Intel on the other in the U.S. in
15 2012. And there's also a license between KAIST and Intel
16 for the Korean counterpart of the '055 patent at the same
17 time.

Facts Involving Intel Agreement

2012 (Intel negotiation):

- Infringement and validity were in question—not assumed (Dkt. 491 (6/12/18 PM) at 194:8-10);
- P&IB would have had difficulty sustaining litigation if it wanted litigation (194:11-16);
- Uncertainty in the industry as to bulk FinFET technology adoption, profits, and savings (194:17-195:8);
- Planar technology was still embraced (195:12-18)

2015 (hypothetical negotiation):

- Planar technology failed (195:13-14); entire industry has shifted over to bulk FinFET (195:16-18)
- No commercially available non-infringing alternatives (195:19-24)
- Parties were able to know and quantify the incremental profits from speed and power benefits and cost savings (197:9-20)

2012: Bulk FinFET Was High Risk

7 And so having us device guys proposing to the
8 manufacturing guys, we're going to make something that
9 sticks up in the air 15 nanometers, they're going, no way,
10 that's not going to work.

11 And so there was great resistance to this. Some of
12 it was genuine. They are hard to make. But a lot of it was
13 just years and years of success with planar having to move
14 to something new. So there was much resistance.

Planar Was Still Embraced in 2012

12 At the time of the Intel negotiation, 20-nanometer planar
13 was still under consideration in the industry. But by 2015,
14 as we've heard, 20-nanometer planar had failed. And the
15 industry had moved toward 14-nanometer bulk FinFET.
16 Finally, in the same concept, 2012, Intel was the only
17 entity going forward with bulk FinFET, but by 2015, the
18 industry had adopted it.

Dkt. 491 (6/12/18 PM), at 195:12-18 (Witt)

Technology Failures Happen After Full Commitment

TSMC and Samsung “fully committed” to 20 nm planar technology:

5 Q. And what was the industry's view overall about the
6 20-nanometer planar?
7 A. If we take a look, the only company that really ran
8 20-nanometer planar at some level of production as a foundry
9 was TSMC, the Taiwan Semiconductor Manufacturing
10 Corporation. And as Dr. Vadi testifies, Qualcomm used
11 20-nanometer manufacturing for its flagship product, the
12 Snapdragon 810.

13 But what we see in PX-0530, that the 810-based
14 phones were slower and had worse battery life, and there was
15 significant discussion in the industry that that was due to
16 the 29-year planar process. Dr. Vadi also testified that 20
17 nanometers was a very expensive technology node.

18 Keep in mind that the whole point of Moore's Law
19 scaling is to get cheaper every generation. So having a
20 more expensive node is a very bad sign.

21 I also show some evidence here from PX-2065 that
22 Nvidia, which is a graphics processing company, was deeply
23 unhappy with TSMC, claiming it essentially worthless, deeply
24 unhappy with the 20-nanometer node.

Dkt. 489 (6/12/18 AM), at 60:5-24 (Kuhn)

Dramatic Change In Industry Between 2012/2015

“At the time infringement began, in May 2006, Home Depot had the luxury of nearly two additional years after its negotiation with Mr. Powell to observe the effectiveness of the saw guard solution . . . which was based on his design. Thus, we are not persuaded that Mr. Powell’s expected profit of \$2,180 per unit in 2004 is a reliable approximation of the upper limit that the parties would have reached during a hypothetical negotiation in May 2006.”

-- ***Powell v. Home Depot U.S.A., Inc.***, 663 F.3d 1221, 1238 (Fed. Cir. 2011)
(emphasis added)

Dr. Becker Admits That 2012 is Different From 2015

18 And I appreciate the -- in 2011 and 2012, P&IB
19 would not know about the billions of dollars of sales of
20 Samsung, GlobalFoundries, and Qualcomm chips that you were
21 required to conclude infringed the '055 patent?
22 A. That's correct.

Dkt. 497 (6/14/18 PM), at 114:18-22 (Becker cross)

“Go Up Significantly” Over Time

9 Q. Now, not all patents are worth the same, fair?

10 A. I think that's true, yes.

11 Q. And the value of patents changes over time, fair?

12 A. It can, yes.

13 Q. It can go up, it can go down, fair?

14 A. Yes.

15 Q. It can go up very significantly, fair?

16 A. Rarely it goes up significantly, but, yes, it can.

Technology is "Suddenly Widely Embraced"

4 Q. We talked about the fact that you understand that the
5 value of patents changes over time, correct?

6 A. Yes.

7 Q. It can change based on market condition, fair?

8 A. Yes.

9 Q. It can change based on whether the technology covered by
10 the patent is suddenly widely embraced by the industry,
11 fair?

12 A. Fair.

13 Q. And so when the jury assesses the damage in this case,
14 one of the factors it can properly consider is whether --
15 whether the technology covered by the patent has suddenly
16 been widely embraced by the industry, fair?

17 A. They could take that into account, yes.

18 Q. In fact, if the technology covered by the patent is
19 suddenly widely embraced by the industry, that could have a
20 significant impact on its value, fair?

21 A. It could, yes.

Dkt. 497 (6/14/18 PM), at 112:4-21 (Becker cross)

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Dr. Becker Did Not Investigate Key Differences Between Samsung and Intel

21 Q. You did nothing to investigate the difference in size
22 between Samsung Electronics in 2015 and Intel in 2012, fair?

23 A. That's fair.

24 Q. You did nothing to investigate the difference between
25 the size of the chip designing manufacturing division at
1 Samsung in 2015 in comparison to the size of Intel in 2012,
2 fair?

3 A. That's fair.

4 Q. You did nothing to investigate the amount of revenue
5 that Samsung anticipates generating from the 14-nanometer
6 process versus the amount of revenue that Intel anticipated
7 generating through the 22-nanometer process, fair?

8 A. Correct, that's fair.

Beware Of Gilding The Evidentiary Record

Defendants in Brief:

“Intel was a larger player than Samsung (6/12/18 PM 220:7-9), so there was no evidence that Intel’s projected profits would have been smaller (let alone 60x smaller).”

Dkt. 604 at 4, n. 4.

Citation does not match up:

7 Q. And you would agree at the time, Intel was the largest
8 American semiconductor manufacturer?
9 A. I believe so, yes.

Dkt. 491 (6/12/18 PM) at 220:7-9 (Weinstein cross)

Dr. Becker Admitted Key Differences From Intel

- “[V]ast majority of chips that are accused of infringement . . . are what is known as mobile system on a chip or SOCs”
Dkt. 497 (6/14/18 PM) at 110:15-18.
 - Samsung & Qualcomm chips are “mobile system on a chip,” or “SOCs.”
Id. at 110:19-25.
 - “Intel did not make any mobile SOCs.” *Id. at 111:1-3.*
- Samsung “doesn’t just make chips,” but also makes the “mobile devices that go into chips”
Id. at 110:6-9.
 - “Intel does not make the devices that chips go into” *Id. at 111:10-11.*
- “The pricing and revenue that Samsung derives from the sale of mobile devices is significant greater than the revenue one would derive from just the sale of the chip.”
Id. at 111:23-112:1.

Mr. Weinstein Properly Took Account of Intel

- Downward adjustment because, unlike Intel agreement, no rights to Korean patent.
Dkt. 491 (6/12/18 PM), at 193:9-199:24;
Ex. 1 at 41 (“showing downward factors analyzed”).
- Intel original offer and final price used as predicate for apportioned benefit split analysis.
Id. at 201:14-202:14 (using final Intel license price as a predicate for his profit split analysis between Defendants and P&IB)

Jury Reasonably Concluded IBM Was Not Comparable

4 Q. Now, you didn't prepare any analysis, whatsoever, as to
5 whether Samsung's accused products are covered by that IBM
6 patent, correct?

7 A. That's true.

8 Q. You didn't prepare any analysis as to whether that IBM
9 patent was valid, correct?

10 A. That's true, as well.

11 Q. You didn't prepare any analysis as to whether -- and by
12 the way, that IBM patent is many years after the '055
13 patent, correct?

14 A. I believe so.

15 Q. You didn't prepare any analysis as to whether there was
16 a performance benefit, speed benefit, or cost benefit
17 associated with the use of the IBM patent, fair point?

18 A. That's true.

19 Q. And so the jury, as a matter of common sense, should
20 keep in mind when they compare the IBM patent to the '055
21 patent, the absence of information we just described about
22 the IBM patent, fair point?

23 A. At least with respect to what I've said, yes.

Dkt. 497 (6/14/18 PM), at 24:4-23 (Subramanian)

Apportionment Occurred

Defendants Waived

- No challenge to Dr. Kuhn's apportionment
- No appeal of Judge Payne's denial of Witt *Daubert*.

Mr. Weinstein Appointed

15 [A.] And so when you summarize all of that, the
16 benefits - this is not the damages, these are the
17 benefits - associated with this technology that would be
18 known to the parties at the time of the hypothetical
19 negotiation are approximately \$2.7 billion in benefit to
20 Samsung; \$2.47 billion to Qualcomm; and \$821 million to
21 GlobalFoundries.

22 Q. And, again, are these just the incremental cost savings
23 and benefits associated with the patent-in-suit?

24 A. Yes, sir. These are just the additional benefits
25 associated with using the patent-in-suit.

Dr. Kuhn Appointed

13 Q. And so, Dr. Kuhn, would you summarize your conclusions?
14 A. Certainly. Overall, my conclusions are the Defendants'
15 14-nanometer bulk FinFET transistors infringe the '055
16 patent. The benefits of using the '055 patent are at least
17 20 percent performance, at least 30 percent simultaneous
18 power improvement, and 25 percent cost savings.

Dkt. 491 (6/12/18 PM) at 38:13-18 (Kuhn)

21 Q. Now, the benefits, what are they attributable to?
22 A. The power performance benefits are directly attributable
23 to the '055 bulk FinFET transistor.

Dkt. 491 (6/12/18 PM) at 22:21-23 (Kuhn)

Dr. Kuhn Appointed

20 Q. Now, is there any other evidence that supports these
21 benefits being attributable solely to the '055 patent?
22 A. Yes. We have some testimony from Dr. Samavedam, who,
23 again, is a senior engineer at GlobalFoundries, and he
24 confirms in his testimony that the performance benefit from
25 28 to 14 is driven by the difference between the planar
1 transistor and the FinFET transistor. And he confirms that
2 the density benefit of 28 compared to 14 is determined by
3 the FinFET, as well. So he confirms that in his testimony.
4 Q. And what about Samsung's engineers, what did they
5 confirm?
6 A. Dr. Kim also confirms that the shape of the Fin in the
7 14-nanometer process is an important contributor to the
8 performance.
9 Q. And so what are your conclusions about the benefits
10 attributable to the '055 patent?
11 A. My high-level conclusions are in going from 20LPE to
12 14LPE, which is the jump from planar to FinFET, there's at
13 least a 20 percent performance improvement and at least a
14 simultaneous 30 percent power improvement attributable
15 solely to the transistor of the '055 patent.

Dkt. 491 (6/12/18 PM) at 28:20-29:15 (Kuhn)

Dr. Samavedam Supports Analysis

13 Q. So to be clear, the performance benefit you see from
14 28-nanometer to 14-nanometer is driven by two things. One
15 is the nature of the difference between the planar
16 transistors and the FinFET transistors, correct?

17 A. Correct.

18 Q. And the other is the density of the FinFET transistors
19 at 14 nanometers, as compared to the density of the
20 transistors at 28 nanometers, correct?

21 A. Yes.

Mr. Witt Appointed

12 Q. And do you have an opinion one way or another about
13 whether the benefits you described are attributable to the
14 14-nanometer FinFET transistor?

15 A. Yes. In my opinion, ***they're all attributed to the***
16 ***14-nanometer FinFET.*** The devices had to get down to
17 14 nanometer. ***There was no other way of building***
18 ***competitive devices at 14 -- without the 14-nanometer***
19 ***FinFET.***

Mr. Witt Compared to Next Best Prior Art Designs

5 Q. (By Ms. Wen) Mr. Witt, what was your role in this case?
6 A. Okay. So it's summarized here. But it's really to
7 evaluate the ***benefit of the 14-nanometer bulk FinFET***
8 ***transistor*** as deployed in the 14-nanometer SoCs from Samsung
9 and Qualcomm, and ***comparing to that to the next best planar***
10 ***devices at 20 nanometers or 28 nanometers***. And at these
11 geometries, there's actually billions of transistors in
12 these SoCs.

Dr. Kuhn Compared to Prior Art Designs

14 Q. Okay. Now, you heard in the Defendants' opening
15 mentioning about prior art patents. Are any of those
16 viable?

17 A. No, sir. I've reviewed several prior art patents. I
18 summarized some of them there. There's a block of patents
19 from Toshiba, there's a patent from Samsung, a much earlier
20 patent, there's a patent from LSI.

21 And *sort of to summarize a higher level and more*
22 *detailed analysis, these patents were never commercialized.*

23 Q. All right. So they just don't work?

24 A. *They just don't work.*

Mr. Witt Considered Prior Art Designs

5 Q. Yes, sir.

6 A. If -- if FinFET designs have not been reduced to
7 practice, and ***I'm not aware of any that were reduced to***
8 ***practice***, then -- then -- then they have no attributable
9 benefit.

Prior Art Can Have No Value

“It is not the case that the value of all conventional elements must be subtracted from the value of the patented invention as a whole when assessing damages. For a patent that combines “old elements,” removing the value of all of those elements would mean that nothing would remain. In such cases, the question is how much new value is created by the novel combination, beyond the value conferred by the conventional elements alone.”

--***AstraZeneca AB v. Apotex Corp.***, 782 F.3d 1323, 1339 (Fed. Cir. 2015)
(citations omitted)

Dr. Kuhn Considered Samsung's Investment

19 Because of the way the industry is structured,
20 *there is going to be another node, and so there's the*
21 *expense of going into manufacture*. They are going to run
22 another node no matter what. And it's not fair to attribute
23 the cost of what is going to inevitably happen.

Speed and Battery Benefits Exist at Phone

8 Q. So what did you do to evaluate the benefit of the
9 14-nanometer bulk FinFET transistor?

10 A. I used the same methodology or -- what I used at Texas
11 Instruments to compare our -- our next generation versus our
12 previous generation, as well as our competitor. I **used**
13 **standard benchmarks that measure key factors that you care**
14 **about in smartphones and -- as well as internal benchmarks.**

15 Q. And as you're comparing Defendants' 14-nanometer chips
16 with their 20 and 28-nanometer planar chips, what attributes
17 that are important to smartphones did you consider?

18 A. So these are the three attributes I did, and they should
19 be familiar to -- well, to me. **But CPU performance -- this**
20 **is web browsing, so everyone wants your web pages to -- to**
21 **come up faster.** That's what this CPU performance will show.
22 **Battery life, everyone wants all these cool**
23 **features to kind of last forever**, so measuring battery life
24 is very important.

Speed and Battery Benefits Exist at Phone

6 Q. And do you have an opinion about the impact of the
7 14-nanometer FinFET transistor on CPU performance in
8 Samsung's chips?

9 A. Yes. *This is the AnandTech benchmark. We talked about*
10 *them before. This is really a good one because this is*
11 *comparing Samsung Exynos SoCs at 20-nanometer compared to*
12 *14-nanometer.* And it's actually just looking at the
13 processor of CPU cores for a fixed amount of power. And for
14 that fixed amount of power, the same cores, how much better
15 or faster would they run in -- in 14 nanometers compared to
16 20.

17 So here we see 18 to 25 percent improvement. That's
18 directly related to the 14-nanometer FinFET. This is
19 PX-0500.

Speed and Battery Benefits Exist at Phone

7 Q. (By Ms. Wen) And were you able to assess the impact of
8 the 14-nanometer bulk FinFET transistor on battery life in
9 Samsung's chips?

10 A. Yes. It's -- it's very similar. The only difference
11 was Samsung actually successfully shipped some 20-nanometer
12 devices. So the benefit's roughly half. That's a more
13 aggressive process technology. The 45 percent at the chip
14 level would be roughly 22 and a half percent. ***And you'd see***
15 ***a 12.375 percent improvement in battery life at the phone***
16 ***level for the Samsung Exynos device.*** Again, you know, a day
17 of use or battery life for Samsung will be very, very
18 similar to what it'd be for Qualcomm.

Semiconductor Industry Faced Extreme Risk in 2012

TSMC and Samsung “fully committed” to 20 nm planar technology:

5 Q. And what was the industry's view overall about the
6 20-nanometer planar?
7 A. If we take a look, the only company that really ran
8 20-nanometer planar at some level of production as a foundry
9 was TSMC, the Taiwan Semiconductor Manufacturing
10 Corporation. And as Dr. Vadi testifies, Qualcomm used
11 20-nanometer manufacturing for its flagship product, the
12 Snapdragon 810.

13 But what we see in PX-0530, that the 810-based
14 phones were slower and had worse battery life, and there was
15 significant discussion in the industry that that was due to
16 the 29-year planar process. Dr. Vadi also testified that 20
17 nanometers was a very expensive technology node.

18 Keep in mind that the whole point of Moore's Law
19 scaling is to get cheaper every generation. So having a
20 more expensive node is a very bad sign.

21 *I also show some evidence here from PX-2065 that*
22 *Nvidia, which is a graphics processing company, was deeply*
23 *unhappy with TSMC, claiming it essentially worthless, deeply*
24 *unhappy with the 20-nanometer node.*

Benefit to Infringer Properly Considered

“[A] jury may consider not only the benefit to the patentee in licensing the technology, but also ***the value of the benefit conferred to the infringer by use of the patented technology.***”

-- ***Powell v. Home Depot U.S.A., Inc.***, 663 F.3d 1221, 1240 (Fed. Cir. 2011)
(emphasis added)

12% of Apportioned Benefit To KAIST IP US

Waived

“In its oral Rule 50(a) motion, RCX argued that judgment as a matter of law was inappropriate because the record contained insufficient evidence to determine that (1) Brown was a statutory employee of RCX and (2) Brown acted negligently when the accident occurred. . . . ***At no time prior to its Rule 50(b) motion did RCX argue that the entire statutory employee doctrine is now defunct.*** By failing to raise this argument in its initial Rule 50(a) motion, RCX waived it.”

-- ***Puga v. RCX Solutions, Inc., 914 F.3d 976 (5th. Cir. 2019).***

12% Profit Split Was Conservative

Samsung margins:

- 37% gross profit margin.
Dkt. 619-1 at Ex. 3
- 13% operating margin.
Dkt. 619-1 at Ex. 3
- 28% margin on infringing chips.
Dkt. 619-1 at Ex. 13.7

Proper Use of Actual Sales/Profits

Dr. Becker Endorsed Use of Actual Sales/Profits

1 give weight to what's known and knowable at the time. And
2 where you need to fill in, you can fill in with future
3 knowledge, like in many cases what was actually sold that's
4 accused of infringement. We don't have projections back
5 from the time, so we rely on what was actually sold.

Hypothetical Negotiation

“Riles did not provide any evidence or testimony to show that Mr. Dry's models reflected what the parties might have agreed to, at any time, particularly at the time the infringement began.”

-- *Riles v. Shell Expl. & Prod. Co.*,
298 F.3d 1302, 1313 (Fed. Cir. 2002)

- “at hypothetical negotiation” (6/12/18 PM)
- Planar failed (195:13-14); entire industry has shifted over to bulk FinFET (195:16-18)
- No commercially available non-infringing alternatives (195:19-24)

Actual Performance Data Available At Time of Hypothetical

14 And it gives two numbers, it gives a 20 percent
15 number right here and a 35 percent number right there. And
16 in both cases, it's from 20 to 14LPE. And this is PX-0889.

17 Q. And is there data that confirms these improvements?

18 A. Yes, there. Amongst the data that was delivered to us
19 by Samsung is a chart, and it was originally an Excel file.
20 And I went in the file and double-checked it to make sure
21 the computations were correct.

22 It's a chart of the transistor-level performance
23 numbers for their devices, and it compares 20LPE to 14LPE.
24 And it has all the transistor parameters in it that device
25 people like to look at.

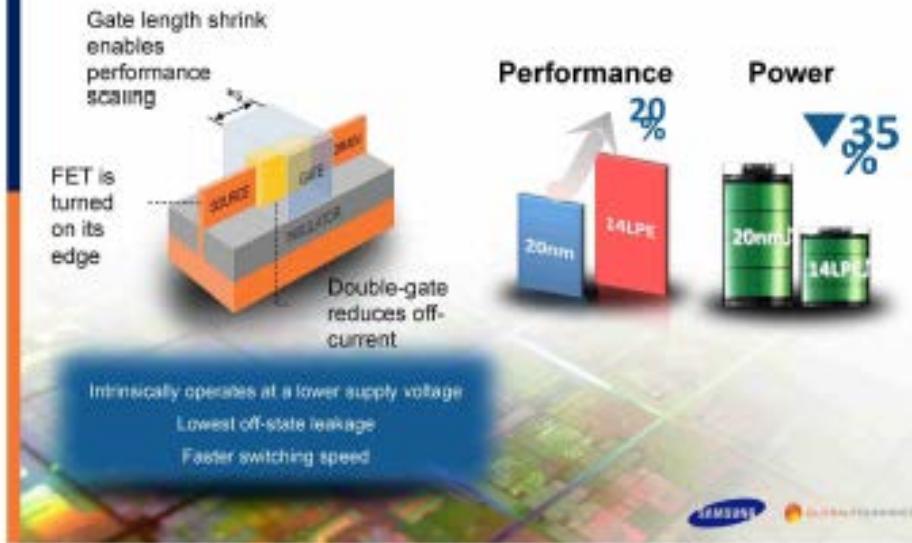
(6/12/18 PM) at 23:14-25 (Discussing internal PX-0889)

Actual Performance Data Available

Samsung-
GLOBALFOUNDRIES
14nm Collaboration

April 2014

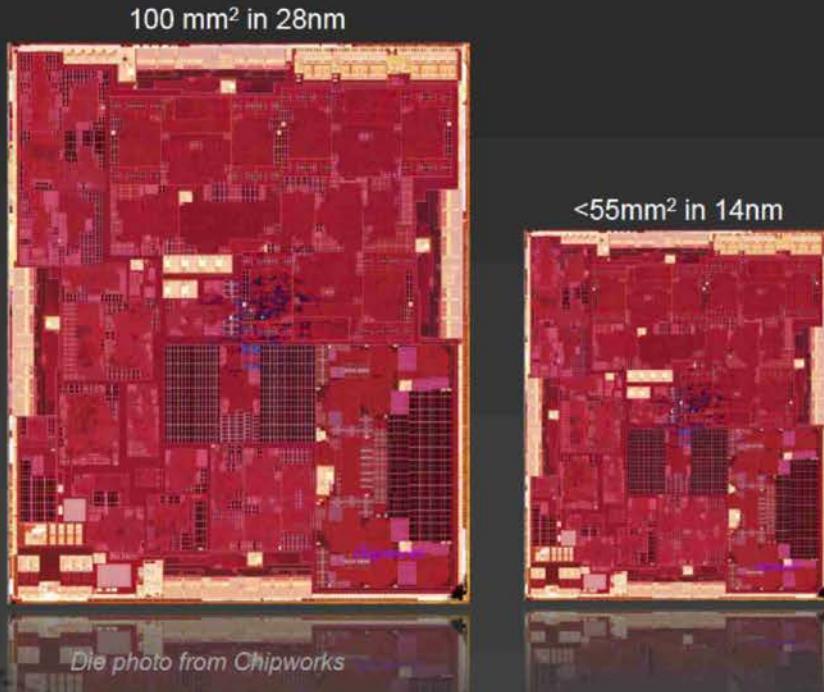
14nm FinFET Offers Breakthrough Power/Performance



PX-0889.4

Cost Savings Analysis Was Available

14nm FinFET Target Application: Premium Mobile



* Power estimated at target performance

- **Key driving forces:**

- Scaling to achieve lower die cost
- Scaling to increase features
- ~2x output increase per wafer
- More than 60% in power reduction

	28nm	14nm
Power (a.u.)*	1	0.4
Performance (GHz)	1.2	>2.2
Area (mm ²)	100	<55
Est. Die Cost (a.u.)	1	0.75

Regression Analysis Was Proper

Benefit to Infringer Properly Considered

“[A] jury may consider not only the benefit to the patentee in licensing the technology, but also ***the value of the benefit conferred to the infringer by use of the patented technology.***”

Infringing saw guard retailed for \$1,295 per unit

Damages of \$7,736 per unit based on value to infringer

-- ***Powell v. Home Depot U.S.A., Inc.***, 663 F.3d 1221, 1240 (Fed. Cir. 2011)
(emphasis added)

Jury Heard That Samsung Recouped All Concrete Costs

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- Samsung received \$220 million in up-front fees plus \$53 million in royalties from GloFo for GloFo's use of Samsung 14 nm tech
- Samsung Corporate Witness
 - “If you're asking about the investment up until now, it's rather difficult for me”
 - “[S]o that we can provide that to our first customers, we're talking about \$300 million.”

Dkt. 495 (6/13/18 PM Sealed) at 6:15-7:3 (David Bennett)
Dkt. 493 (6/13/18 AM) at 99:16-22 (Dongwon Kim)

Dr. Becker Replicated Mr. Weinstein's Results

7 A. Yes, I -- in terms of my testing of Mr. Weinstein's
8 model, I ***replicated his model using the same regression tool***
9 ***that he did.***

Dr. Becker Only Presented One Additional Variable

6 Q. The *only variable that you presented that impacted the*
7 *regression was RAM*, true?
8 A. Yes.

Dr. Becker Only Presented One Additional Variable

17 Furthermore, I *understood from Mr. Witt's testimony*
18 *that the patent-in-suit actually has an impact on RAM*
19 *performance. It makes it more valuable.*

20 And as a consequence, the RAM variable, if it were
21 included, would be picking up the impact of the patent in a
22 way that would interfere with the question that we're trying
23 to address here. It's sort of a technical issue, but in
24 that concept -- in that context, RAM doesn't belong in this
25 regression. It does belong with the tablet regression, and
1 I included it.

Dr. Becker Only Presented One Additional Variable

4 So you think of RAM, next generation RAM is kind of
5 like tires, okay? *So if you have a faster interface you can*
6 *grab to and from the things faster. But if you don't have*
7 *those GPUs on top, lots of GPUs, then it's kind of like*
8 *putting monster tires here*, the RAM, on something without
9 lots of GPUs, a Toyota Prius, instead of something that
10 would actually take advantage of it.

No Exhaustion

No Double Counting

Q. Did you double count any of the Qualcomm chips that are being talked about here today?

A. No, sir. I calculated damages only once per chip. There was absolutely no double counting.

(6/13/18 AM) at 32:22-25 (Weinstein)

Dr. Becker Defined the Hypothetical Negotiation as Involving All Defendants

Negotiation involves “Samsung, GlobalFoundries, and Qualcomm”:

3 | I imagined a negotiation between Professor Lee and
4 | P&IB and Samsung, GlobalFoundries, and Qualcomm. And in

All Benefits to Infringer Properly Considered

Increased profits: "Thus, it was proper for the jury to consider Mr. Powell's evidence regarding Home Depot's desire to keep its radial arm saws to ***maintain a competitive advantage*** over other home improvement stores that did not offer custom-cut lumber services and ***protect its profits from sales of goods often sold in conjunction with custom-cut lumber***."

Cost savings: "\$8,500 per unit, representing the amount that Home Depot spent at seventy-one stores in late 2005 to replace radial saws[.]"

-- ***Powell v. Home Depot U.S.A., Inc.***, 663 F.3d 1221, 1240 (Fed. Cir. 2011) (emphasis added)

Post-trial Motions Hearing

SAMSUNG'S MOTION FOR NEW TRIAL (DKT. 579)

KAIST IP US OPPOSITION (DKT. 595)

SAMSUNG REPLY (DKT. 606)

KAIST IP UPS SURREPLY (DKT. 621)

\$4.74 Running Royalty For Each infringing Handset

4 Q. So what's the total speed and power efficiency damages
5 rate for smartphones?

6 A. Well, as I said, the next step would be to add those two
7 up, and so I've done that on the next slide, I've added the
8 two. And the total rate is \$4.74.

Incremental Profits for Samsung Alone

15 And so when you summarize all of that, the
16 benefits -- this is not the damages, these are the
17 benefits -- associated with this technology that would be
18 known to the parties at the time of the hypothetical
19 negotiation are approximately \$2.7 billion in benefit to
20 Samsung; \$2.47 billion to Qualcomm; and \$821 million to
21 GlobalFoundries.

Defendants Sought Foundry and Customer Rights

6 What kind of rights do they need? They need exactly
7 the same type of rights that Intel got both in terms of
8 make, sell, and have made rights, foundry rights, and rights
9 for their customers, because these chips that are accused
10 here go into other products. They go into smartphones made
11 by Samsung, and they go into smartphones and tablets made by
12 other people.

Court Sent Back Jury Response Defendants Agreed to

11 MR. KINNAIRD: Yes, we're fine with it, Your Honor.

12 THE COURT: I'm going to sign the response that I've
13 read and that you've commented on. To the extent the
14 Plaintiffs have an objection, I'll overrule it, and I'll
15 direct the Court Security Officer to deliver this response to
16 the jury.

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Defendants Allowed to Present Evidence that SiO₂ and HfO are Separate Layers

- Dr. Subramanian testified that SiO₂ and HfO layers are separate. Dkt. 496 (6/14/18 AM) at 19:1-7, 19:18-20, 20:1-7, 20:19-24
- Dr. Subramanian testified that neither HfO nor SiO₂ alone could be a first oxide layer on which a gate is formed. Dkt. 496 (6/14/18 AM) at 23:1-24

→ **NO opinion in Subramanian Report that HfO is an “intervening layer.”** See Dkt. 219-2 (Subramanian Rebuttal), ¶¶ 100-105, 112-113, 117, 123-125

- Defendant fact witnesses presented intervening layer theory:

“And on top of the silicon Fin, the light -- light-colored region is the silicon oxide layer. And immediately on top of the silicon oxide layer, the dark-colored region is -- is the Hafnium oxide layer.”

Dkt. 494 (6/13/18 PM) at 84:18-21 (Samavedam)

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Defendants Allowed to Present Evidence that SiO₂ and HfO are Separate Layers

Defendants' counsel agreed that Dr. Subramanian's opinion was that HfO and SiO₂ form a single gate oxide:

7 THE COURT: It's clear from what happened in our
8 discussion in chambers that 'the Hafnium oxide layer and the
9 silicon dioxide layer together form a single oxide layer.
10 And he's not going to say that both of them together are not
11 the single oxide layer.

12 MR. SOOBERT: Precisely.

13 THE COURT: He hasn't said that yet. He's talking
14 about the two component parts.

15 MR. SHEASBY: Okay.

16 THE COURT: If he says that they are separately or
17 they're not together the oxide layer, which I assume you're
18 going to ask him point blank on cross, then I have something
19 to deal with.

20 MR. SHEASBY: I understand.

21 THE COURT: But as long as he stays where he is,
22 he's within the scope of his report.

23 MR. SOOBERT: Yeah.

Dkt. 496 (6/14/18 AM) at 21:7-23; *see also id.* at 23:25-25:19

Defendants Allowed to Present Evidence that SiO₂ and HfO are Separate Layers

Court only excluded Dr. Subramanian's attempt to testify that that HfO was not part of a single gate oxide, but what Defendants now call an "intervening layer":

6 THE COURT: I'm going to sustain that objection.
7 And I do believe the witness has exceeded the scope of his
8 report with that last statement.
9 And I'm going to instruct the jury to disregard the
10 witness's statement that the requirements cannot be met by
11 the Hafnium oxide layer because the Hafnium oxide layer
12 breaks up that sequence.
13 He's going beyond the scope of his report, counsel.
14 That's my finding.

Dkt. 496 (6/14/18 AM) at 24:6-14; *see also id.* at 23:25-25:19

Defendants Allowed to Present Evidence that HfO Contacts the Gate and SiO₂ Contacts the Fin

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5 So in the -- in the -- in the GlobalFoundries
6 products, between the gate and the silicon Fin, we have two
7 layers. We have Hafnium oxide layers that are in contact
8 with the gate and a second oxide layer that is on top of the
9 FIN [sic].

Dkt. 494 (6/13/18 PM) at 85:5-9 (Samavedam); *see also* Dkt. 498 (6/15/18) at 93:1-96:10 (same argument made in Defendants' closing)

Dr. Subramanian Admitted There is a Single Gate Oxide Made of HfO + SiO2

24 Q. Sir, let me reask the question.

25 ***There's one gate oxide?***

1 ***A. Yes, sir.***

2 ***Q. Made up of Hafnium oxide and silicon dioxide, yes or no?***

3 ***A. Yes, sir.***

Dr. Subramanian Admitted That Specification Discloses One Continuous Layer

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15 Q. In fact, *the specification describes the first oxide*
16 *layer and gate oxide layer as different regions of one*
17 *continuous layer that surrounds the Fin active region*, fair?
18 A. Yes, generally that's a fair description.
19 Q. Is it -- is it a fair description, yes or no?
20 A. *Yes, I think so.*

Dkt. 496 (6/14/18 AM) at 86:15-20 (Subramanian cross)

Samsung Engineers Admitted One Continuous Layer

9 QUESTION: And so just like in that figure, it's
10 depicting one continuous -- continuous oxide layer on all
11 three sides of the Fin, correct?
12 ANSWER: Correct.

Defendants' Witnesses Had No Difficulty Identifying the Top and Side Surfaces of the Fin

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- Dr. Wallace was able to identify:

11 Q. (By Mr. Sheasby) Now, you're able to identify
12 side-walls and upper surfaces on the Fins in this case,
13 correct?
14 A. Correct.

Dkt. 494 (6/13/18 PM) at 194:11-14; *see also id.* at 194:15-195:17.

- Heedon Jeong was able to identify:

7 QUESTION: Would you explain where along the Fin
8 the gate oxide layer resides?
9 ANSWER: By looking at this figure, gate oxide
10 resides on both sides and on the top as one oxide, and that
11 is the process we use.

Dkt. 493 (6/13/18 AM) at 49:7-11; *see also id.* at 49:12-50:12, 52:9-12.